

# **Overview and Status Update** **Iowa Soybean Association Environmental** **Programs**

## **Presentation To Iowa General Assembly Agriculture and Natural Resources Appropriations Subcommittee**

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<http://www.iasoybeans.com/environment/>



# Iowa Soybean Association Environmental Programs

Is part of ISA's Strategic Operations Plan -

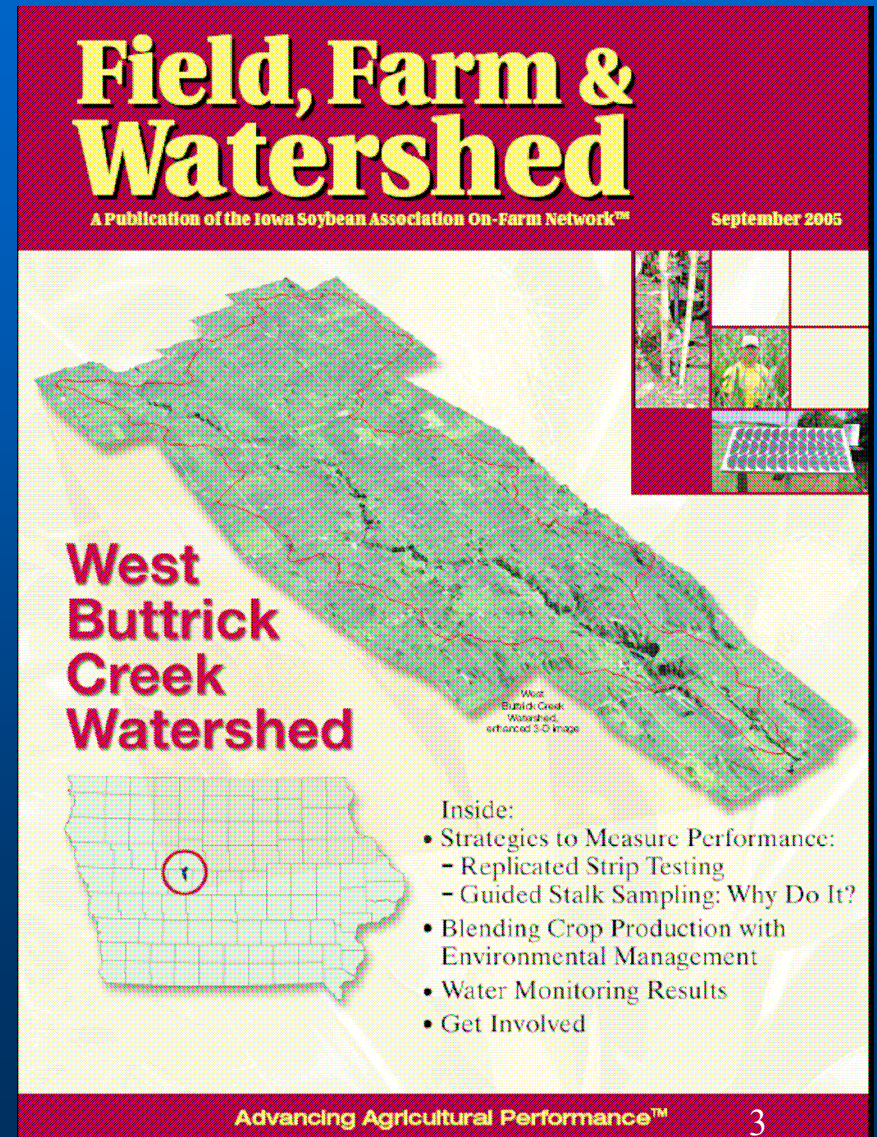
Goal 2: Stabilize and increase yield while improving production efficiency and the environment.

Objective 9: Advance agricultural leadership for environmental quality by developing, applying, and promoting programs that assist producers to perform agronomically and economically.



# Seeking and Capturing Performance

- Guided by farmer self-interest and responsibility
- Outcomes - Agronomic, Economic and Environmental
- Crossing multiple geographic scales
- Applying science to gain understanding, impact and profit
- Valuing cooperative partnerships and collaborations



# CEMSA

Farm planning that combines conservation and farm management – environmental management system

Developing the program since 2002

Incorporating an international standard (ISO 14001) with the NRCS 9-step Conservation Planning Process



# CEMSA

- Create a plan to help a farmer address natural resource concerns
  - Minimum nutrient, soil, and pest management plan
  - 2007 added energy as a resource concern
- Incorporates business management principals
  - Continual improvement cycle – plan, do, check, act
  - Environmental policy, legal requirements, communication
- Implement evaluation and testing
  - Provides feedback to the management plans
- Works with Technical Service Providers – Crop Consultants

# Energy Planning and Assessment

- Background & Goals
  - Provide guidance to farmers
  - Increase awareness of energy conservation
  - Focus on in field energy usage
  - Provide a way to evaluate alternatives
  - Incorporate the results into a farm plan

# Energy Planning and Assessment

- Calculator Planning Tool:
  - Developed by MGT Envirotec
  - Supported by Iowa NRCS and NRCS Resource Conservation and Development
  - Allows specific practices to be selected
    - Direct energy – tillage, planting, spraying, fertilizing, haying, harvest, grain drying
    - Indirect energy – nutrient formulation
  - Allows comparisons across energy sources



Client: \_\_\_\_\_  
 Farm: \_\_\_\_\_  
 Field: \_\_\_\_\_

Is this a rotation?: \_\_\_\_\_  
 Enter Rotation Year: \_\_\_\_\_  
 Crop: \_\_\_\_\_  
 ACRES: \_\_\_\_\_

## Direct Energy

### Tillage Operations

	GDFE/ acre
Shredding Corn Stalks	0.45
Disk-chisel Plow	1.3
Field Cultivate, tilled field	0.65
	0
	0
<b>Total</b>	<b>2.4</b>

### Chemical Application

# of Applications		
1	Spray pesticides	0.15
	<None>	0
		<b>0.15</b>

### Planting

Planter w/fert&pest, tilled seedbed	0.55
	0
<b>Total</b>	<b>0.55</b>

### Fertilizer/Nutrient Application

Dry Fert Spreader, bulk cart	0.15
Apply NH3, plowed ground	0.7
	0
	0
<b>Total</b>	<b>0.85</b>

## Indirect Energy

### Fertilizer

		RATE/ acre	UNITS	GDFE/a cre
<b>Nitrogen</b>	Anhydrous Ammonia	160	lbs nutrient	24.96
<b>Phosphorus</b>	Diammonium Phosphate(DAP)	80	lbs nutrient	0.48
<b>Potash</b>	Muriate of potash	30	lbs nutrient	0.2532
<b>Lime</b>	lime	2	lbs fertilizer	0.002
<b>Composite Fertilizers</b>			lbs fertilizer	0
				<b>25.70</b>



## Harvest

Grain	Combine - Corn	1.45
		0
	<b>Total</b>	<b>1.45</b>

Forage		0
	<b>Total</b>	<b>0</b>

Hay		0
#Cuttings		0
	<b>Total</b>	<b>0</b>

## Transportation and Handling

In Field	Corn Grain	0.2
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		# Miles	
Additional	Corn Grain	5	0.75
	<b>Total</b>		<b>0.95</b>

## Grain Drying

Yield: bu/acre	185
Harvest Moisture	19 %
Ending Moisture	15 %

Btu/lb water removed

Drying System	High Temp, air recirculating	2500
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Propane Cost	\$1.54	\$/Gal.	11.00	15.984	Gal LP/acre
Electricity Cost	\$0.12	\$/Kwh	1.28	15.6108995	Kwh/acre
	<b>Total</b>		<b>12.28</b>		

Diesel Fuel Cost	3	\$/Gal.
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IMPORTANT! BE SURE TO LOOK OVER INPUTS AND VALUES BEFORE COPYING TO REPOF

Clear All Inputs

Copy to Summary

View Summary

TOTAL INDIRECT ENERGY	25.70	GDPE
Fertilizer	25.70	
TOTAL DIRECT ENERGY	18.63	GDPE
Tillage/Planting	2.95	
Chem/Fert Application	1.00	
Harvest/Transportation	2.40	
Grain Drying	12.28	
TOTAL GDPE AS FUEL/AC	6.35	\$19.05
TOTAL LP GAL./AC	15.98	\$24.62
TOTAL KWH/AC	15.61	\$1.87

9

Total GDPE/ACRE

44.33

# Watershed Program

- Provide leadership, scientific and technical services to advance agriculture's environmental performance in organized watersheds through multi-scale planning, applied evaluation, adaptive management and targeted conservation.
- Multi-partners and collaborators
- Place-based and issue specific

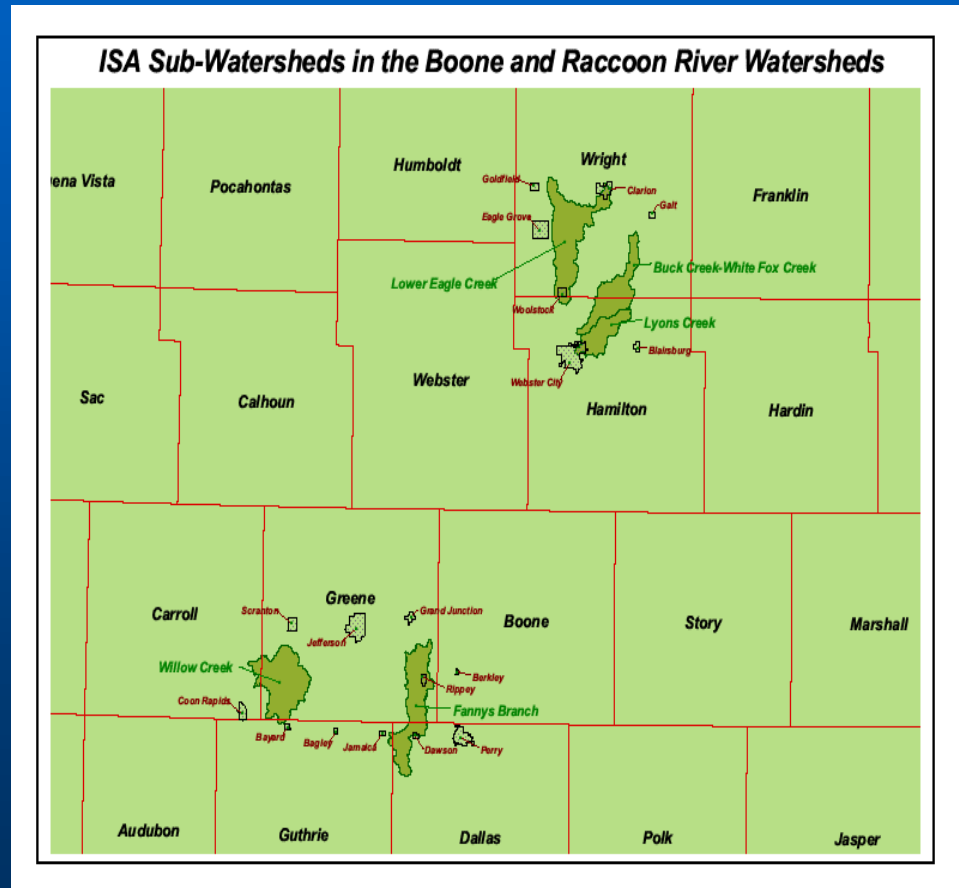
# Watershed Program

## Elements:

- CEMSA planning with groups of farmers
- Management Evaluation – Groups / Replicated Strips Trials/Stalk sampling
- Environmental evaluation via water monitoring
- Targeted Conservation Systems – Bioreactor, Shallow Wetland, others
- Technical Service Contracts – ACWA / DMWW / TNC / ISU / Prairie River and Prairie Winds RC&D's
- Multi-scale watershed assessment and planning facilitation

# ISA Conservation Innovation Grant

- Develop watershed plans
- Monitor water quality
- Develop Resource Management plans for 100 – 120 producers
- Conduct evaluation for 100 – 120 producers
- Aggregate evaluation results
- Bring additional financial and technical resources to the watersheds



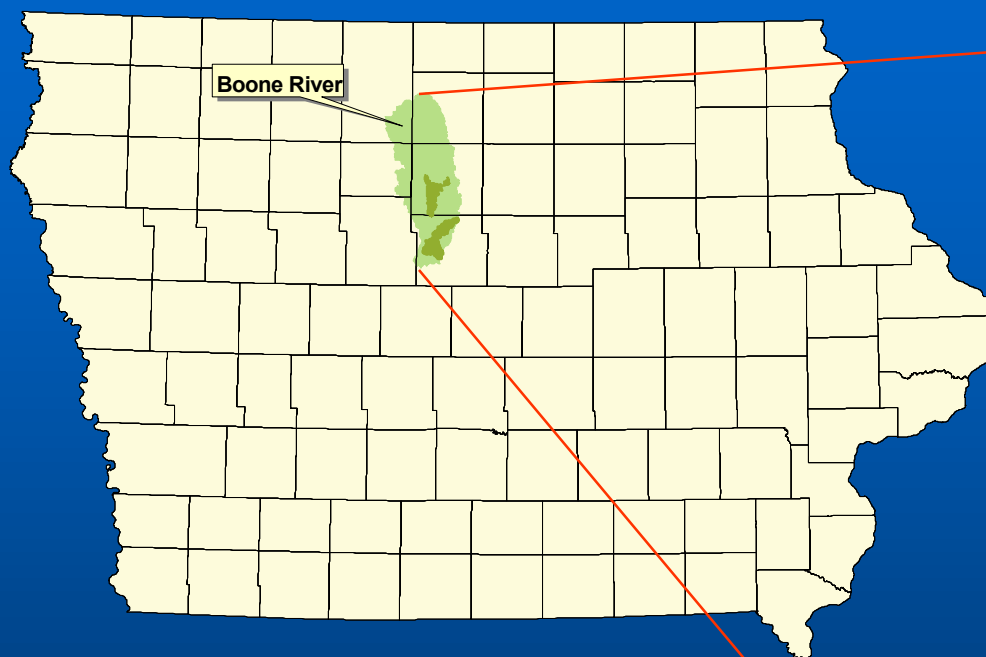
# Monitoring Foundation

- Certified Sampling - QAQC
  - Nitrate and Bacteria
- Real-time Remote Monitoring
- Investigative Monitoring
  - Ammonia
  - Cyanobacteria
- Effectiveness and Special Project Monitoring
  - Bioreactors
  - Event-triggered monitoring
  - Paired micro-watershed studies

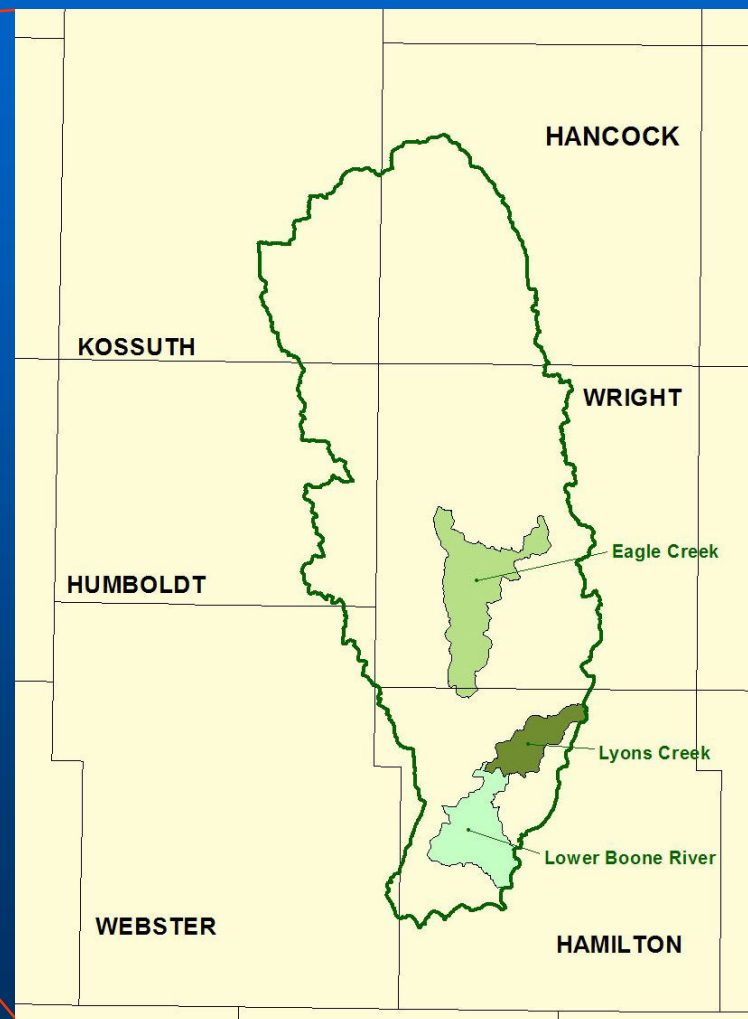




# Boone River Watershed Example



- Covers six counties  
(Webster, Hamilton, Humboldt, Wright, Kossuth, & Hancock)
- Approximately 581,000 acres
- 85% row-crop



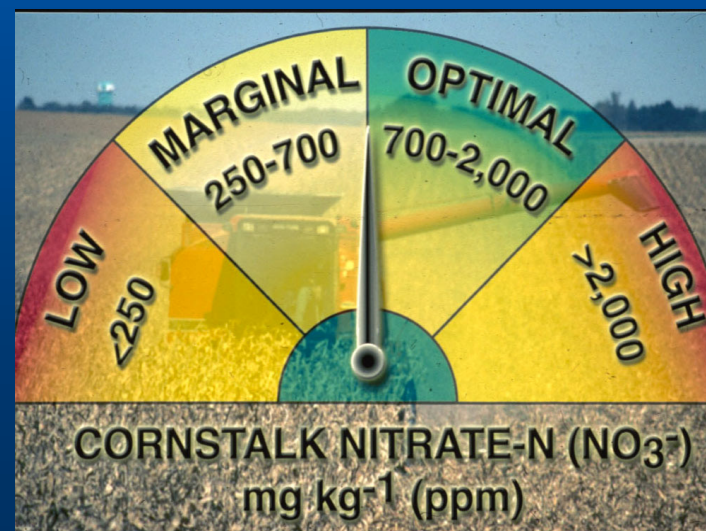
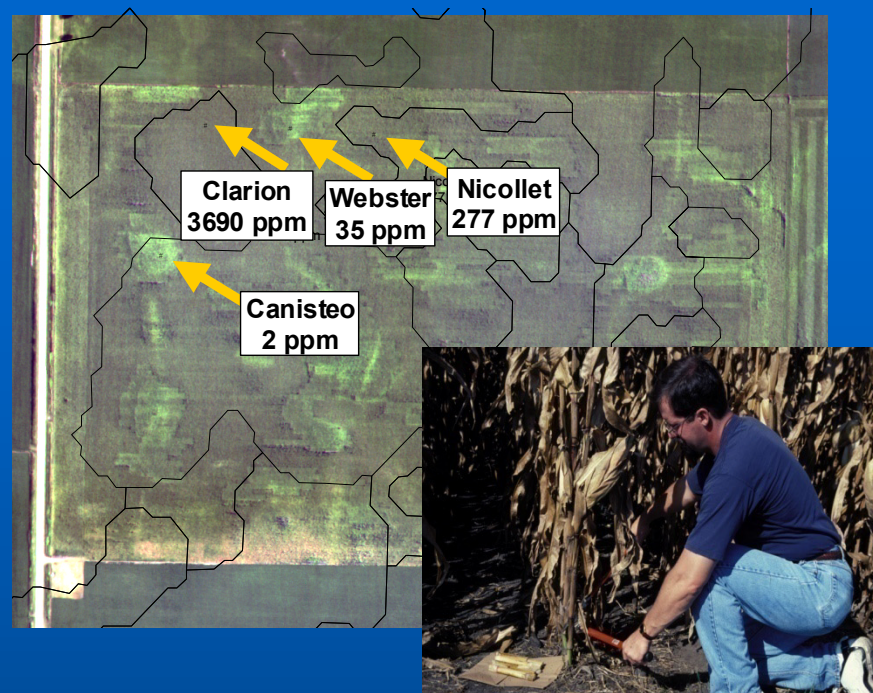
# Local Watershed - Planning Process

- Stakeholders direct resource planning in the watershed
- Allows stakeholders to work toward developing and implementing local recommendations
- Water quality improvements and resource planning cannot occur without understanding issues and solutions.
- The insight and experience brought to the planning process by local stakeholders is irreplaceable; maybe more valuable than technical data.
- Stakeholders have a vested interest in water quality and resource improvement; directly impacts health, safety, and resource opportunities.

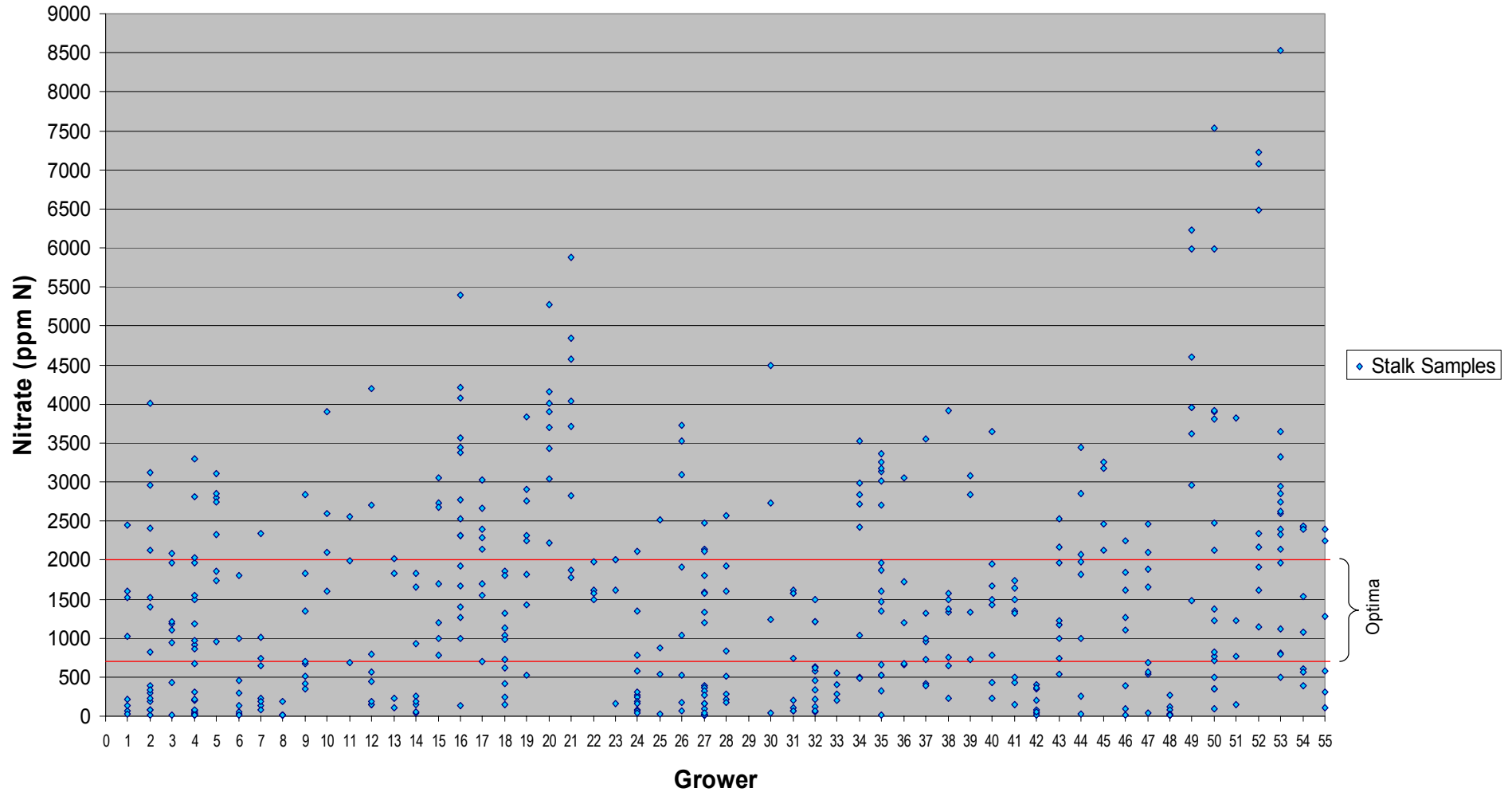
# N Management

## Stalk Test

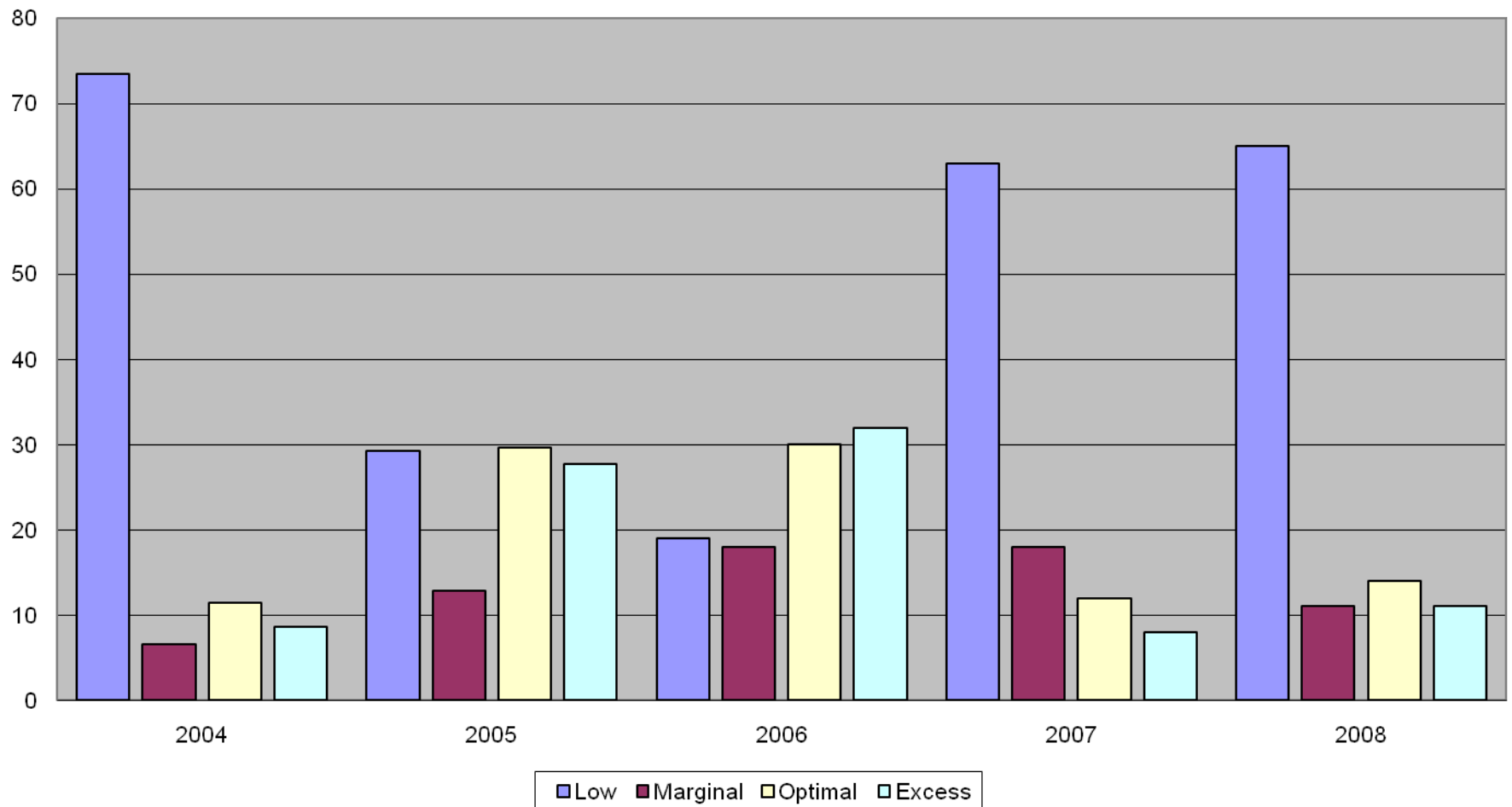
- Stalk nitrate samples collected after physiological maturity to assess the N status of the crop.
- As the corn plant takes up N, it first accumulates in the ear to achieve maximum yield, then the lower portion of the stalk.
- The Stalk Nitrate Test determines excess N availability, even at levels where yield is not limited.



## 2006 Corn Stalk Nitrate Analysis (*Boone River*) : Comparison Between Growers



## Boone River - Results of Nitrogen Evaluation

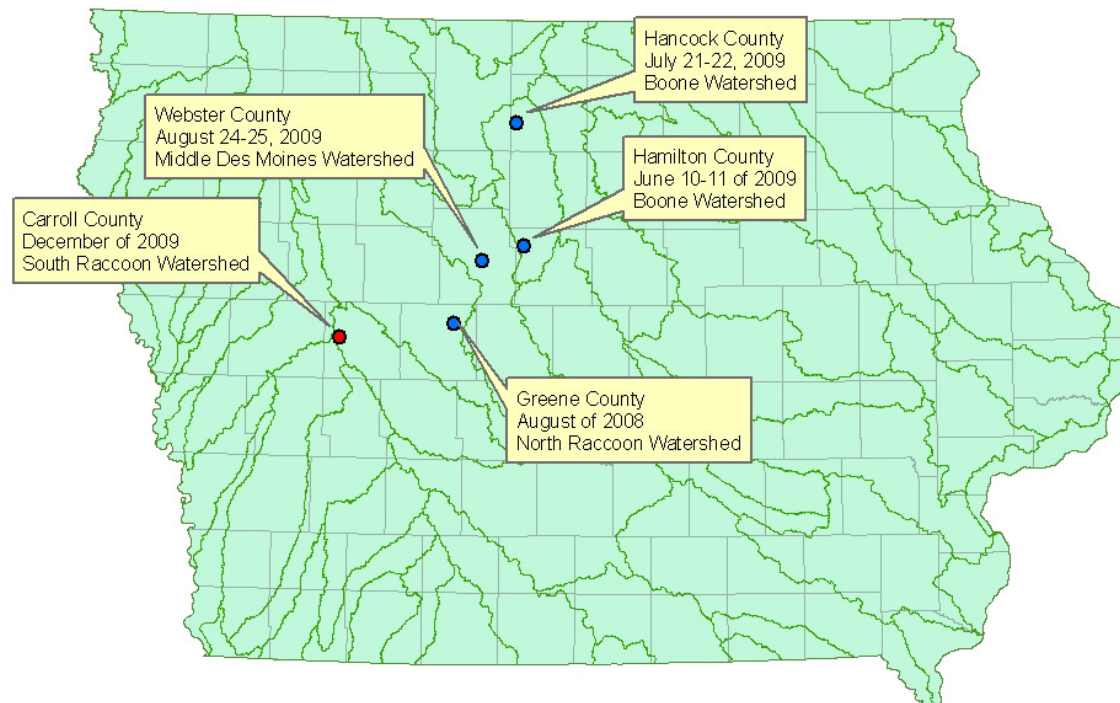




# Bioreactor Demo and Evaluation

- End of tile nitrate treatment process
- Under anaerobic conditions nitrate-N is reduced by soil microbes using the wood chips as a carbon source
- Typical costs of installations range from \$6,000 - \$10,000
- Bioreactor size has been between 0.06 – 0.08% of acres treated
- Observed a 38% load reduction during the 2009 growing season in Greene County

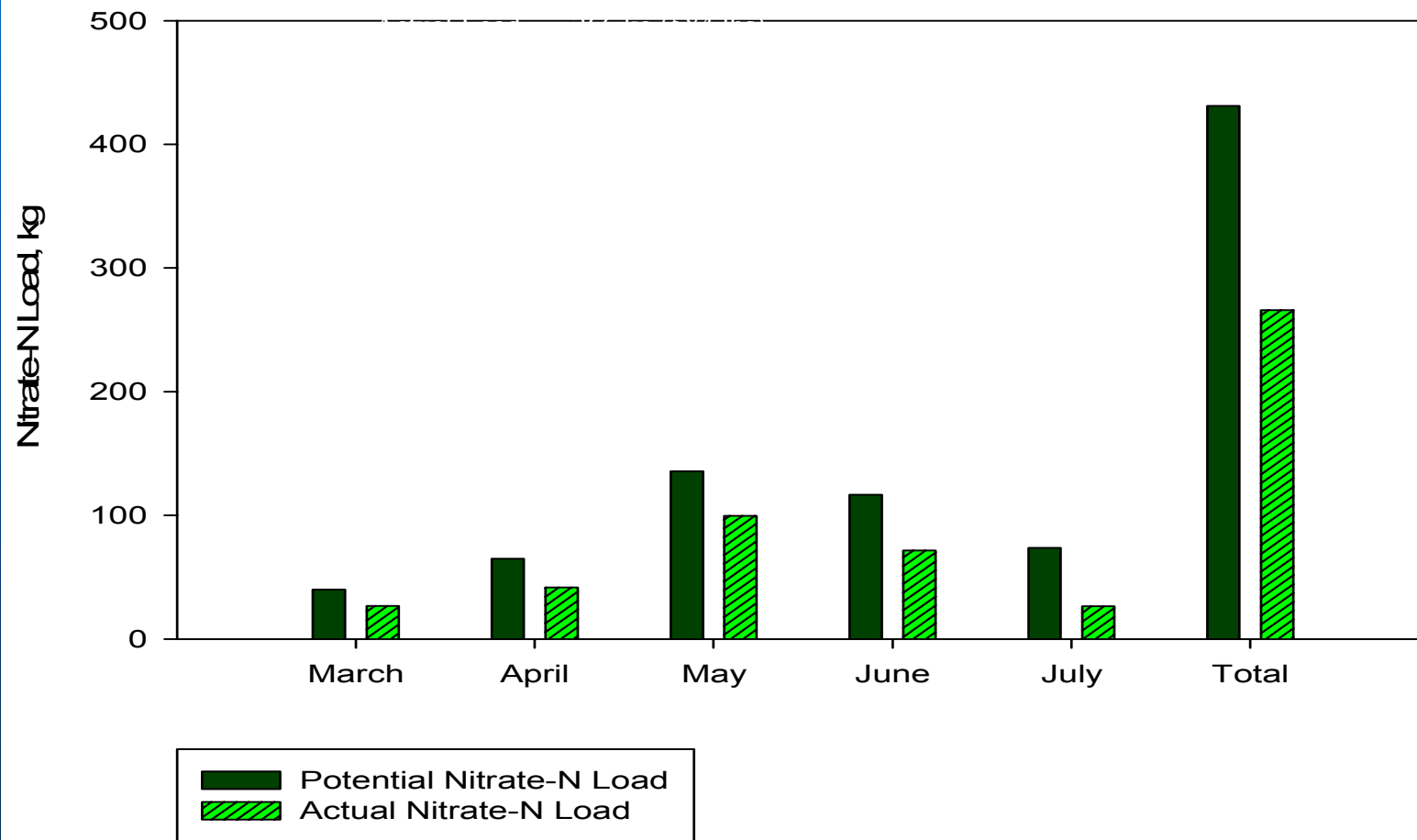
## Status of ACWA Bioreactor Installations



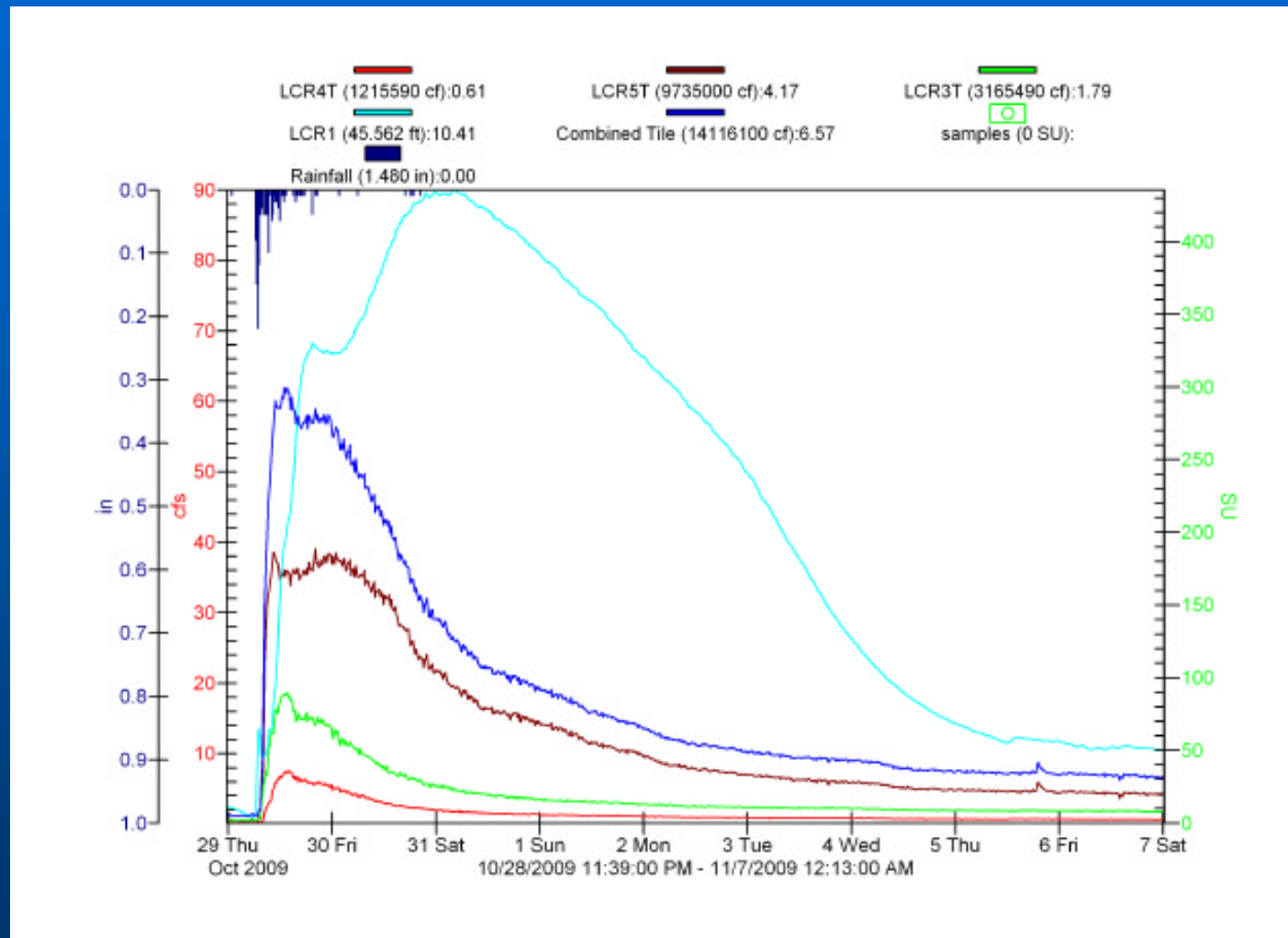
### Bioreactor Status

- Future Installation
- Installed

# Greene County Bioreactor Nitrate-N Load Reductions During the 2009 Growing Season

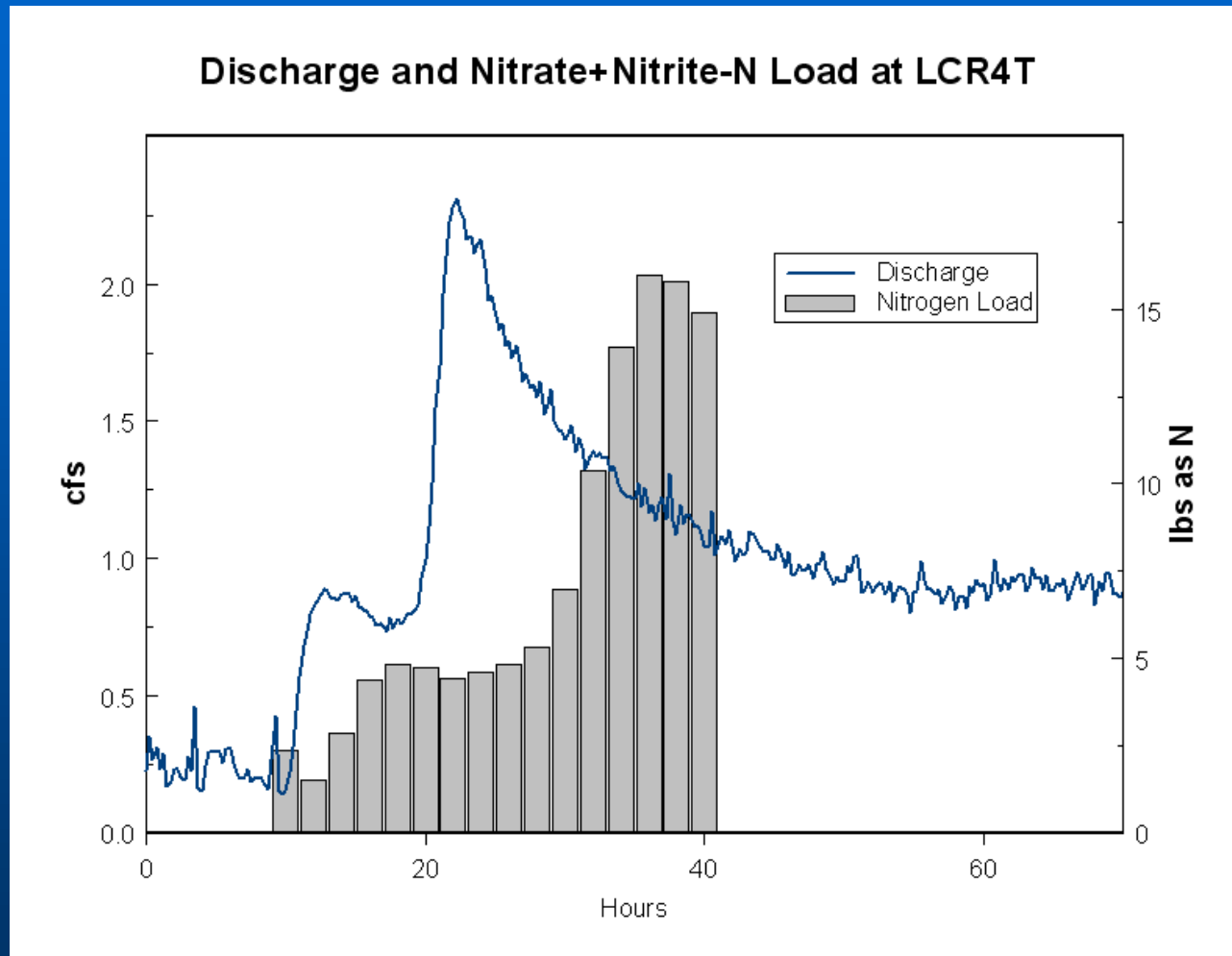


# Lyons Creek Paired Watershed Study



Calibration Phase – Runoff Event Hydrograph

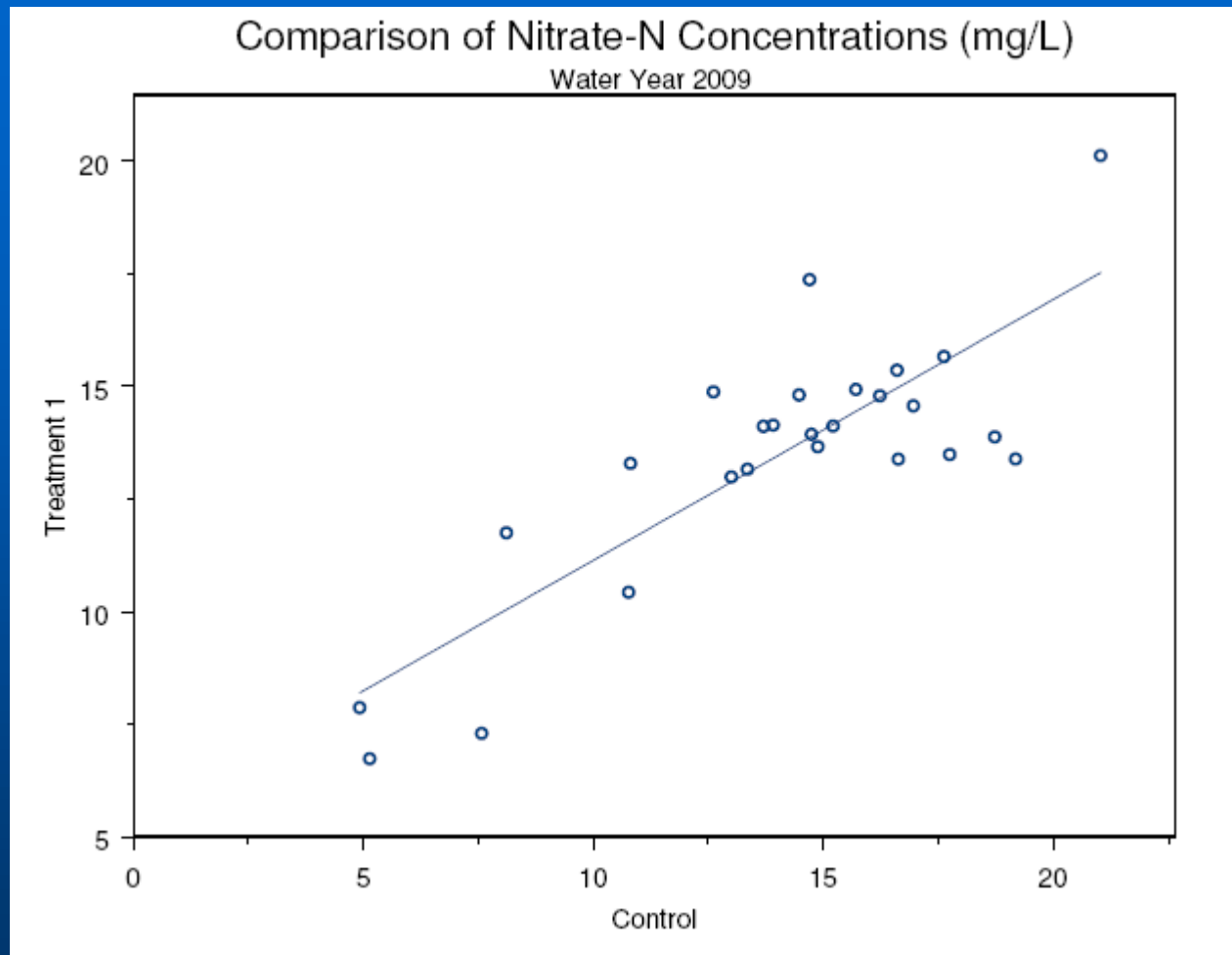
# Lyons Creek Paired Watershed Study



Calibration Phase – Runoff Event - Hydrograph



# Lyons Creek Paired Watershed Study



Calibration Phase - Correlation Control to Treatment 1

# Lyons Creek Paired Watershed Study

## Potential Practices for Treatment Watershed

- Cover Crops
- Intensive Nutrient Management (timing, rate, form)
- Edge of Field Buffers - Tile line Bioreactors, Riparian Buffers, Constructed Wetlands
- Drainage Water Management
- Tillage changes – Strip till, No-Till
- Alternative Surface water intakes

# Making Progress Faster

- Help farmers know the environmental potential of their actions.
- Enable monitoring and measuring of agro-ecosystem response and then strategies need to be based upon open, credible data, documented to demonstrate response linkages.
- Create a means to provide support for localized on-farm and watershed-based planning with applied evaluation and aggregation of data.
- Need new ways to track and identify success. Agencies and private sector need to find ways to reach agreement on indicators of success and secure accountability.

# Making Progress Faster

- Provide a means to support organized initiatives among groups of farmers in watersheds to maximize results.
- Efforts need to be able to reach those producers, land, and practices that are most likely to meet objectives for least cost. Focusing nutrient control efforts to high priority areas are required.
- Opportunities are abundant to collaborate – watershed institutional infrastructure capacity needs to grow.